



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,396	09/11/2003	Hidefumi Abe	031153	3768
38834	7590	12/16/2005	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			RO, BENTSU	
			ART UNIT	PAPER NUMBER
			2837	

DATE MAILED: 12/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/659,396

Applicant(s)

ABE ET AL.

Examiner

Bentsu Ro

Art Unit

2837

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,4-6,8,9 and 12-20 is/are rejected.
- 7) ☒ Claim(s) 2,3,7,10 and 11 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/3/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

FIRST OFFICE ACTION

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4-6, 8, 9, 12-20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Watanabe US Patent No. 5,880,565.

Claims read onto Watanabe's teaching as follows:

The claims:	Watanabe's teaching:
<p>1. A drive apparatus for a brushless motor,</p> <p>the brushless motor including a rotor having opposite magnetic poles arranged on a periphery of the rotor,</p> <p>and a stator facing the rotor</p> <p>and having at least three interconnected coils at equal angular intervals,</p> <p>the drive apparatus comprising:</p>	<p>Watanabe's Fig. 1 teaches a drive apparatus for a brushless motor, the words "brushless motor" is repeatedly mentioned in the text, for example, column 1, lines 6, 37; column 4, line 57; column 5, lines 24-25; etc.</p> <p>Fig. 3 shows the rotor 2 having opposite magnetic poles N-S-N-S-N-S arranged on a periphery of the rotor 2;</p> <p>Fig. 5 shows a brushless motor 1 with field winding 3 facing the rotor 2; the field winding 3 has three phases U, V and W;</p> <p>Figs. 3 and 6 both show stator phases U, V, W; each phase has two coils U1, U2; V1, V2; W1, W2 arranged at equal angular intervals;</p>

<p>memory means for storing drive data which represent drive currents to be supplied to the respective coils at each of predetermined angular positions of the rotor;</p> <p>control means for reading those drive data which best match a target angular position of the rotor, from the memory means,</p> <p>and for generating drive signals based on the read drive data; and</p> <p>a drive circuit for supplying the drive currents to the respective coils, based on the generated drive signals.</p>	<p>Fig. 1 shows a "LEARNED VALUE STORAGE MEANS" 12, which is a memory means for storing drive data which represent drive currents to be supplied to the respective coils at each of predetermined angular positions of the rotor;</p> <p>Fig. 4 shows the current patterns P1-P6 to be supplied to the winding 3 of the brushless motor 1 (or the actuator 1) corresponding to the different angular positions of the rotor based on sensed voltage by the sensor 6;</p> <p>Fig. 1 shows an actuator control means 17, which is a control means for reading the pattern data from the learned value storage means 12;</p> <p>the output of the actuator control means 17 is a drive signal;</p> <p>Fig. 1 shows an actuator drive means 18, which is a drive circuit for supplying the drive currents to the respective coils, based on the generated drive signals.</p>
<p>4. The drive apparatus according to claim 1, wherein the brushless motor controls movement of an electronic throttle valve of an engine.</p>	<p>Fig. 5 shows an electronic throttle valve 5 driven by the brushless motor 1.</p>
<p>5. The drive apparatus according to claim 4, wherein the target angular position of the rotor is determined by a position of an accelerator pedal.</p>	<p>Fig. 5 (at the lower-left corner) shows an opening degree "A", the opening degree A is determined by a position of an accelerator pedal.</p>
<p>6. The drive apparatus according to claim 1, wherein the drive circuit includes a</p>	<p>Fig. 5 shows a 3-Φ bridge circuit 8 (an inverter circuit) having six FETs.</p>

plurality of field effect transistors.	
8. The drive apparatus according to claim 1, wherein the at least three interconnected coils are 3 x n coils (n is a natural number).	Figs. 3 and 6 shows 3- Φ windings having six coils; thus, n = 2.
9, 12, 13, 14.	Method claims similar to claims 1, 4, 5, 8, respectively; discussion is omitted.
<p>15. An apparatus for driving a brushless motor, the brushless motor including a rotor having opposite magnetic poles arranged on a periphery of the rotor, and a stator facing the rotor and having at least three interconnected coils at equal angular intervals, the apparatus comprising:</p> <p>a controller for generating drive signals corresponding to a target angular position of the rotor,</p> <p>when a difference between the target angular position of the rotor and a current angular position of the rotor is smaller than a predetermined value; and</p>	<p>same as that of claim 1 except now referring to Fig. 5;</p> <p>Fig. 5 circuit includes an actuator control means 17, which is a controller for generating drive signals corresponding to a target angular position of the rotor,</p> <p>applicant should read column 3, lines 6-12, these lines state the same inventive subject matter as claimed;</p> <p>these lines state the inventive subject matter as follows : "<u>text</u> (and explanation)"</p> <p><u>"Thus, provision is made of a sensor for detecting the accelerator opening degree A (this angular opening degree A is a target angular position of the rotor) and a sensor 6 for detecting the throttle opening degree T (this throttle opening degree T is a current angular position of the rotor) the rotor 2 of the actuator 1 is coupled to the rotary shaft 5a of the throttle valve 5</u></p>

<p>a drive circuit for supplying drive currents to the respective coils, based on the generated drive signals.</p>	<p><u>supported in the intake passage 4,"</u></p> <p>the word "difference" is not mentioned in the text, but there is always a difference between the target position and the sensed position, or otherwise, the servo control becomes un-necessary;</p> <p>the difference can be any value because the so-called "a predetermined value" is un-defined;</p> <p>text continued : <u>"and the field winding 3 is excited (the winding 3 is excited by the inverter 8) based upon the opening data to drive the rotor 2, in order to control the amount of the air intaken by the enging."</u></p> <p>the reason of the excitation of winding 3 to move the rotor to the target position is because there is a difference.</p>
<p>16. The apparatus according to claim 15, wherein if a difference between the current angular position of the rotor and the target angular position is greater than the predetermined value,</p> <p>the controller does not generate the drive signals,</p> <p>but selects two of the three coils based on the angular position difference</p>	<p>this limitation reads onto the case that if the accelerator pedal is suddenly increased to a larger value (suddenly accelerate),</p> <p>the controller determines that next phase windings should be excited in order to increase the throttle valve opening, therefore, the controller does not generate signal for the currently excited windings;</p> <p>it is noted from Fig. 5, that two windings must be excited at any time because there is no center tap for exciting each individual winding;</p> <p>in order to further open the throttle valve, the controller energizes the next further two windings to further opening the throttle</p>

Art Unit: 2837

and supplies signals to the drive circuit so as to supply appropriate currents to the selected two coils, until the angular position difference is not greater than the predetermined value.	valve; the controller energized the next stage of windings to further opening the throttle valve via the inverter circuit 8, so that the target value (the accelerator pedal angular position A) and the throttle valve opening angle T is consistent, see Fig. 5.
17. The apparatus according to claim 16, wherein the predetermined value is 60 degrees.	for each next winding excitation, the angular position increment is 60 degrees because there are six coils, one circle 360-degrees divided by six coils gives 60 degrees per coil.
18, 19 and 20.	same as that of claims 4, 5 and 6, respectively.

3. Claims 2, 3, 7, 10, 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

5. Any inquiry concerning this communication should be directed to Bentsu Ro at telephone number 571 272-2072.

12/10/2005


Bentsu Ro
Senior Examiner
Art Unit 2837